

Remarks

Attached is an AMENDMENT TO CLAIMS. The specific mention of “alkylated benzothiophenes” as types of sulfur compounds to be reduced in the process of the present invention may be found in the instant text on page 2, line 19.

Rejections Under 35 USC § 103

Applicants first wish to further articulate the fact that Yamaguchi does not teach the use of nickel in a catalyst employed for hydrodesulfurization. Yamaguchi generically teaches a catalyst for hydrotreating hydrocarbon oils. For the generic term “hydrotreating”, nickel and cobalt may both be referred to as preferred metals.

However, when Yamaguchi focuses on hydrodesulfurization, a species of hydrotreating, it is only the Group VIII metal cobalt that is specified and exemplified. The teaching is not that nickel is less preferred, but in fact the teaching is that only cobalt is effective for hydrodesulfurization. Yamaguchi thus teaches away from the use of nickel for hydrodesulfurization, and therefore cannot be used as indicia of obviousness (*In re Bratt*, 16 USPQ2d 1812).

Equally important is the Examiner’s adherence to his position that Yamaguchi is drawn to anything other than a conventional HDS process. As was succinctly pointed out in the previously submitted Declaration of Dr. Plantenga, the Examiner’s position ignores the context in which the Yamaguchi invention was made. A skilled person would read Yamaguchi in the context of its background, and recognize the implied properties of the feed and product described therein.

As explained in the Plantenga Declaration, at the time Yamaguchi originated, in 1992, HDS was effected to reduce the sulfur content of a feedstock from a value of the order of a few percent to a value of about 0.15 wt.% (1500 ppm). Accordingly, the skilled person will recognize that Yamaguchi relates to catalysts suitable for effecting conventional HDS, because this was the only HDS process known at the time of origin of Yamaguchi. Note in this context that Yamaguchi does not disclose anything about the sulfur content of the product; only relative activities are given.

Yamaguchi does disclose in column 1, lines 38-42 that it has been noticed that the conventionally prepared catalysts cannot satisfactorily meet an ever growing demand on reducing the levels of sulfur and nitrogen compounds in the heavy oils or the like, but that statement was in the context of the Yamaguchi catalyst being unconventional, not the process to which it is applied being unconventional. Yamaguchi alleges superiority in reducing sulfur and nitrogen compounds, both that is only with regard to conventional HDS where the feedstock has a sulfur content far in excess of the 500 ppm as required by the present invention.

As is further explained in the Plantenga Declaration, the conventional HDS described in Yamaguchi and the ultra-deep HDS that is the subject of the present invention are comparable only in name. They differ in feedstock properties, in product properties, in compounds to be converted and in reaction mechanisms. Conventional HDS involves conversion of sulfides, disulfides, thiophenes and benzothiophenes via direct sulfur extraction, as opposed to ultra-deep HDS that deals mainly with the conversion of alkylated dibenzothiophenes via hydrogenation followed by sulfur extraction.

Therefore, at the time the present invention was made, one of ordinary skill in the art would not only have no reason to believe that catalysts effective for conventional HDS as in Yamaguchi would be effective for ultra-deep HDS, because of the completely different sulfur chemistry involved in the respective processes, that person would be actually dissuaded from using the catalyst of Yamaguchi in ultra-deep HDS in view of the knowledge that a good HDS catalyst will generally not be a good catalyst for ultra-deep HDS.

The Examiner ignores the fundamental differences between the respective hydrodesulfurization processes of Yamaguchi and those of the present invention that renders Yamaguchi irrelevant to the patentability of the instant claims. The Examiner disregards the difference between the compounds converted in conventional HDS, such as thiophenes, versus ultra-deep HDS, such as alkylated dibenzothiophes. Even though not indicated in words, in fact Yamaguchi is limited to thiophene conversion, or at least to the easily convertible sulfur compounds.

The instant claims now require that in the process of the present invention there is a reduction of the amount of alkylated dibenzothiophes in the feedstock. This, of course, could not occur in the Yamaguchi process, but, in any event, Yamaguchi gives no hint to its occurrence. It would certainly not be obvious to one of ordinary skill in the art that the process of Yamaguchi involves reduction of alkylated dibenzothiophes.

With regard to the rejection of the present claims as being obvious over EP 0 870 817 in view of Yamaguchi, as indicated above, Yamaguchi describes catalysts for conventional HDS, and a skilled person seeking a catalyst suitable for use in ultra-deep HDS would not consider the conventional-HDS catalysts described in Yamaguchi, because he would have no reason to believe that these catalysts would work in ultra-deep HDS.

Absent from EP 0 870 817 is any hint to employ an organic additive as required by the instant claims. Yamaguchi discloses use of an organic additive to contribute to catalyst activity, but catalyst activity is related to the chemistry of the sulfur compounds to be converted. For some reason the additive of Yamaguchi results in a catalyst that is highly active in the above described sulfur-compound conversion process that takes place in conventional HDS, as opposed to the above described sulfur-compound conversion process that takes place in ultra-deep HDS.

Yamaguchi is unclear about the reaction mechanism involving the organic additive. He explicitly states that he does not understand what is going on. He indicates that it may have something to do with the prevention of agglomeration, but the causal effect between additive, metals agglomeration, and activity is unclear.

There is nothing in Yamaguchi which would lead a skilled person to the expectation or even the suggestion that something which, for unclear reasons, increases the activity of a catalyst in the conversion of sulfides, disulfides, thiophenes and benzothiophenes via direct sulfur extraction would also be good in the conversion of alkylated dibenzothiophenes via hydrogenation followed by sulfur extraction. There would thus be no expectation of success in combining EP 0 870 817 with Yamaguchi.

Conclusion

The present invention is not obvious over Yamaguchi, because to arrive at the present invention from the disclosure of Yamaguchi one of ordinary skill in the art would have to somehow know that a certain catalyst effective in conventional HDS would also be effective in ultra-deep HDS, in spite of the

chemistry of the two processes being completely different and knowledge that a good HDS catalyst will generally not be a good catalyst for ultra-deep HDS.

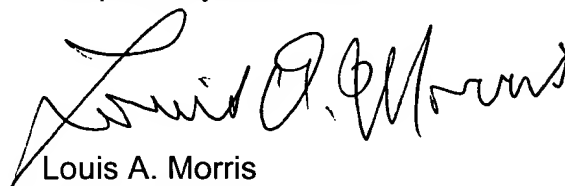
He would also have to know to disregard the teaching in Yamaguchi of the use of Co, and use Ni instead of or in addition to Co.

To combine Yamaguchi and EP 0 870 817 to arrive at the present invention, one of ordinary skill in the art would also somehow have to know to use the organic additive of Yamaguchi in the process of EP 0 870 817, again, in spite of the chemistry of the two processes being completely different.

Any of the above would in fact be exercises in hindsight, clearly not permitted under the law. The claimed subject matter is thus non-obvious over Yamaguchi, or the combination of Yamaguchi and EP 0 870 817.

It is respectfully requested that instant claims 1-8 be allowed and that the present application proceed to issue in due course.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Louis A. Morris". The signature is fluid and cursive, with the first name "Louis" being more prominent and the last name "Morris" following in a similar style.

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